

REMARKS / ARGUMENTS

Claim 13 has been amended to overcome the 35 U.S.C. § 112 objections, as required by the Examiner.

The rejection of Independent Claims 1 and 29 and Dependent claims 2 to 10, 18, 21 to 28 and 30 as being obvious and unpatentable based upon the KATO '706 patent, in view of the PUMA '640 patent and in further view of the GOODWIN '238 patent under 35 U.S.C. § 103(a) is respectfully traversed. It is respectfully submitted that these are improper rejections under the case of Graham v. John Deere because the Examiner is improperly using hindsight in an attempt to reconstruct the present invention based upon the aforementioned **three (3)** prior art patents.

The KATO '706 patent discloses an abnormality-detecting device for use in the vehicle brake system for detecting the amount of wear in the brake lining element and temperature rise in the brake system. Cumulative reductions in the effective thickness of the lining element are detected by measuring the coil inductance variation by a pick-up coil fixed to the brake shoe. The coil also detects the occurrence of a critical temperature rise in the brake system.

The PUMA '640 patent discloses a brake lining wear detector for visually indicating the condition of the brake linings without the necessity of making visual examination of the brake system. The apparatus includes a spring-urged electrical element freely suspended and penetrating the brake lining, while utilizing the brake drum as an electrical grounding

element, so that a resistive electrical continuity is made when the brake lining is reduced by wear to a particular point where replacement is desirable but not urgently necessary.

The Goodwin '238 patent discloses a linear temperature sensor that incorporates passive bipolar semiconductor devices and is capable of high accuracy over a very wide temperature range. The passive bipolar semiconductor device splits a voltage drop between the bipolar semiconductor and a resistor, such that the voltage drop varies approximately linearly in negative dependence on temperature.

The KATO '706 patent, the PUMA '640 patent and the GOODWIN '238 patent, **even when combined, do not disclose or teach** the following elements of Independent Claim 1 for a vehicle brake having a brake monitoring and sensor system being attached to a brake shoe of a brake assembly:

a) the brake shoe lining having first rivet openings with rivets therein, and having second rivet openings with no rivets therein;

b) a sensor system having a first sensing element and a second sensing element each being connected to the brake shoe; the first sensing element being embedded in one or more of the first rivet openings with the rivets therein; the second sensing element being embedded in one or more of the second rivet openings having no rivets therein;

c) the first sensing element for generating a first electrical signal in response to sensing changes in the temperature of the brake shoe generated by heat in the brake shoe, the heat being transmitted to one or more rivets in the first rivet openings;

d) the second sensing element for generating a second electrical signal in response to sensing a predetermined depth of wear of the brake pad; and

e) a monitoring unit for processing the first and second electrical signals generated by the first and second sensing elements.

There is **no teaching** in the KATO patent that its brake system uses first rivet openings with rivets therein and second rivet openings with no rivets therein which have been removed to receive the second sensing elements; where a first sensing element is for sensing temperature of the brake shoe and uses the temperature from one or more rivets in the first rivet openings to determine a detrimental or fail temperature of the brake shoe, and where the second sensing element disposed in the rivet openings is used for sensing a depth of wear of the **brake pad**. KATO teaches its wear sensing device detects wear in the brake lining of the brake system, whereas the present invention as claimed, detects wear in the brake pad.

Further, KATO uses one sensor for detecting both wear and heat. However, the present invention claims two separate sensing elements for each wheel, one for sensing wear and one for sensing heat. This novel structure provides a number of unobvious advantages. First, if one sensing element fails, the other sensing element will still work, thus providing extra safety to the truck driver, which the KATO patent **does not provide** to the truck driver.

A second advantage in the present invention is the first sensing element disposed in the rivet openings senses the heat being transmitted to one or more rivets in the first rivet

openings to more accurately reflect the heat generated in the brake shoes where the rivets are located. The KATO patent does detect the heat generated in its rivets. In fact, KATO is **silent** on the use of rivets for detecting heat from heat and wear sensors.

The third advantage is that the monitoring unit of the present invention uses visual and auditory/sound alarms as stated in Claims 23 to 25, thus providing further safety to the truck driver if one or both of the sensing elements should fail. KATO only provides for a visual indicator of a brake system failure.

Still another advantage of the present invention is the braking system uses heat sensors on the brake shoe because the heat sensors draw the heat out of the brake lining, such that the brake lining is always on a cooling down phase for each brake application by the truck driver. In this manner, the brake shoe is holding the heat ΔH longer, such that the brake temperature readings in the present invention are more accurate. **None** of the aforementioned prior art references use this more accurate temperature reading technique for its heat sensors.

There is **no teaching** in the PUMA patent that its brake system uses first rivet openings with rivets therein and second rivet openings with no rivets therein; where a first sensing element is for sensing temperature of the brake shoe and uses the temperature from one or more rivets in the first rivet openings to determine a detrimental or fail temperature of the brake shoe, and where the second sensing element disposed in rivet openings is used for sensing a depth of wear of the **brake pad**. PUMA teaches its wear sensing device detects wear in the brake lining of the brake system, whereas the present invention as

claimed, detects wear in the brake pad.

Further, PUMA uses one sensor for detecting only wear, and not temperature. However, the present invention claims two separate sensing elements for each wheel, one for sensing wear and one for sensing heat. This novel structure provides a number of unobvious advantages. First, if one sensing element fails, the other sensing element will still work, thus providing extra safety to the truck driver, which the PUMA patent **does not provide** to the truck driver.

A second advantage in the present invention is the first sensing element senses the heat being transmitted to one or more rivets in the first rivet openings to more accurately reflect the heat generated in the brake shoes. The PUMA patent does detect the heat generated in its rivets. In fact, PUMA is silent on the use of rivets for detecting heat from heat and wear sensors.

The third advantage is that the monitoring unit of the present invention uses visual and auditory/sound alarms as stated in Claims 23 to 25, thus providing further safety to the truck driver if one or both of the sensing elements should fail. PUMA only provides for a visual indicator of a brake system failure.

GOODWIN **does not teach** detecting temperature anywhere in a braking system, or using a temperature sensor within first rivet openings with rivets therein of the brake shoe, as claimed by applicant.

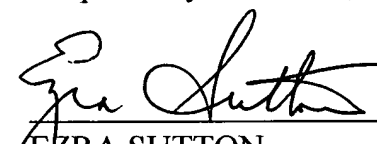
None of the aforementioned prior art patents to KATO, PUMA and GOODWIN teach the aforementioned elements of sections a), b), c), d), and e), even when the patents are combined.

Therefore, Independent Claim 1 is patentable and should be allowed.

CONCLUSION

Therefore, the prior art patents of KATO '706, PUMA '640 and GOODWIN '238, even when combined, do not teach or disclose the claimed features of Independent Claims 1 and 29 and the Claims which depend therefrom. For these reasons, it is respectfully submitted that Applicant's Claims 1 through 30 should be allowed.

Respectfully submitted,


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